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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 3, 2017/2018

### **BPO2614 – PRODUCTION & OPERATIONS MANAGEMENT** (All sections / Groups)

01 JUNE 2018

9.00 a.m – 12.00 p.m

(3 Hours)

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#### **INSTRUCTIONS TO STUDENTS:**

1. This Question paper consists of 8 pages with 5 Questions only.
2. Attempt **ALL FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answer in the Answer Booklet provided.

**QUESTION 1**

- (a) A company manufactures specialty pollution-sensing devices for the offshore oil industry. One particular device has reached maturity, and the company is considering whether to replace it with a newer model. Technologies have not changed dramatically, so the new device would have similar functionality to the existing one, but would be smaller and lighter in weight. The firm's three choices are: (1) keep the old model, (2) design a replacement device with internal resources, (3) and purchase a new design from a firm that is one of its suppliers. The market for these devices will be either "receptive" or "neutral" of the replacement model. The financial estimates are as follows: Keeping the old design will yield a profit of \$6 million dollars. Designing the replacement internally will yield \$10 million if the market is "receptive," but a \$3 million loss if the market is "neutral." Acquiring the new design from the supplier will profit \$4 million under "receptive," \$1 million under "neutral." The company feels that the market has a 70 percent chance of being "receptive" and a 30 percent chance of being "neutral."

- (i) Draw the appropriate decision tree.

[3 Marks]

- (ii) Calculate the expected value for all courses of action.

[5 Marks]

- (iii) What action yields the highest expected value?

[2 Marks]

- (b) Susan has a part-time business producing seasonal plywood yard ornaments for resale at local craft fairs and bazaars. She currently works 8 hours per day to produce 16 ornaments.

- (i) What is her productivity?

[2 Marks]

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- (ii) She thinks that by redesigning the ornaments and switching from use of a wood glue to a hot-glue gun she can increase her total production to 20 ornaments per day. What is her new productivity?
- [2 Marks]
- (iii) What is her percentage increase in productivity?
- [1 Marks]
- (c) What is a product-by-value analysis, and what type of decisions does it help managers make?
- [5 Marks]

## QUESTION 2

- (a) Axita Accounting Software is marketed to small accounting firms throughout the South East Asia Countries. Owner Afiq Raman has decided to outsource the company's help desk and is considering three providers: Manila Call Center (Philippines), Delhi Services (India), and Cyberjaya Nobel (Malaysia). All the three firms have responded to his request for bids, and he has started to perform an analysis on the scores his OM team has entered in the table below.

		RATINGS OF OUTSOURCE PROVIDERS		
FACTOR	WEIGHT	CYBERJAYA	DELHI	MANILA
Skilled personnel	2	8	9	8
Flexibility	5	6	5	5
Quality procedures	4	6	8	7
Trustworthiness	4	5	5	4
Price	3	6	7	5
Management team	3	8	6	6

Continued...

Weights are on a scale from 1 through 5, and the outsourcing provider scores are on a scale of 1 through 9. The weight for the quality procedures is shown as a  $q$  because Axita's OM team cannot agree on a value for this weight. For what range of values of  $q$ , if any, is Cyberjaya Nobel a recommended outsourcing provider, according to the factor-rating method.

[7 Marks]

- (b) Periodic examination of products is appropriate because strategies change as products move through their life cycle. Explain how changes in the product life cycle affects an organisation's operation management strategy.

[7 Marks]

- (c) The American Society for Quality defines quality as the *"totality of features and characteristics of a product or service that bears on its ability to satisfy stated or implied needs."* Others however, believe that definitions of quality fall into several categories. Differentiate between the three (3) categories of Quality definitions.

[6 Marks]

### QUESTION 3

- (a) Read the following case and answer the given questions.

#### **Case Study: ICICI Bank**

ICICI Bank is India's second-largest bank in terms of assets (\$93 billion). The bank currently has subsidiaries in Europe, North America, and Asia, notably in Malaysia, Singapore, and Indonesia. Debashis Sarkar, the leader of the Organizational Excellence Group, is in charge of developing Lean techniques for ICICI. Lean has been widely applied to manufacturing with great success, and since the financial crisis in 2008, service companies have increased their efforts to improve flexibility while reducing operating costs. In the early 2000s, Sarkar went against the general trend that favoured Six Sigma methods applied to services. Coming from an industrial background, he decided to apply Lean, notably with the 5S techniques. He wanted tools that would be easily understood by the vast majority of employees, so everyone in the company could become, in effect, a continuous improvement facilitator.

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When Lean is applied to the services sector, it is commonly called Lean Office, and its characteristics are similar to the characteristics of Lean in manufacturing: identifying value in processes and removing waste. Waste in services can be identified as overproduction of documents, batch processing of those documents versus a flow treatment of requests, long downtime of IT support services, and the need for corrections or operators' excessive motion to retrieve information.

Like other good project managers, Sarkar started to implement the changes on a small scale so he could understand the specificities of Lean applied to services. Once he had tackled the initial challenges, he engaged the methods on a wider scope. The first target he set was to retrieve documentation in less than 30 seconds, and this laid the groundwork for a myriad of improvements. Customer response time decreased dramatically, processes became clearer and more efficient, workplaces became more manageable thanks to the removal of excessive documentation, and operating expenses plummeted. Once these improvements caught the CEO's attention, it was decided to roll out the technique globally.

However, the transformation didn't happen overnight, and many challenges had to be addressed, mainly due to the nature of services themselves. Processes are not visible, and they are complex, people-intensive, and technology dependent. All these elements combined make the visibility of the improvement projects especially difficult. Therefore, employees need to become champions of change, and they need adequate training.

Successful improvement efforts are generally achieved when adequate training is provided. However, most trainers recognize that traditional classroom teaching methods are not sufficient for training employees on Lean techniques and establishing the culture of continuous improvement in a company. As a result, Lean Office simulation games have emerged. These games have been successful for several reasons: Employees from service organizations are more likely to use computers than are employees from a shop floor, Lean is starting to be accepted as an improvement method applied to services, and Web-based simulations provide additional features compared to PC-only training games.

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During a normal Lean Office training session, trainers used to come to the workplace and animate workshops on pull and push flows. Now, thanks to the ubiquitous nature of the Internet, Lean training is taking the form of an online simulation game, enabling employees to play with the different tools; this “learning by playing” has been very successful both among managers and employees.

A good Lean Office training simulation game should be intuitive, self-explanatory, and fun to play with to stimulate employees’ engagement. Many Lean improvements have failed in companies because senior management, in their strategic approach to continuous improvement, have not recognized the need to incorporate employees and workers into the scheme. Staff are the champions of Lean and will drive the improvements over time. The success of Sarkar and ICICI in their bid to implement Lean Office relies mainly on the fact that they started on a small scale to test the different requirements and ensured that they would engage with employees’ desire to change.

- (i) Why do you think employees sometimes feel threatened by productivity improvements?

[4 Marks]

- (ii) If you were to implement Lean Office at ICICI Bank, what messages would you like to communicate to employees?

[4 Marks]

- (iii) What methods would you use to communicate with ICICI employees? Do you think using different media would be a good idea?

[4 Marks]

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- (b) A quality analyst wants to construct a sample mean chart for controlling a packaging process. He knows from past experience that the process standard deviation is two ounces. Each day last week, he randomly selected four packages and weighed each. The data from that activity appear below.

	Weight			
Day	Package 1	Package 2	Package 3	Package 4
Monday	23	22	23	24
Tuesday	23	21	19	21
Wednesday	20	19	20	21
Thursday	18	19	20	19
Friday	18	20	22	20

- (i) Calculate all sample means and the mean of all sample means. [3 Marks]
- (ii) Calculate upper and lower 2-sigma x-bar chart control limits that allow for natural variations. [Hint:  $UCL = \bar{\bar{x}} + z\sigma_{\bar{x}}$ ;  $LCL = \bar{\bar{x}} - z\sigma_{\bar{x}}$ ] [3 Marks]
- (iii) Based on the x-bar chart, is this process in control? [2 Marks]

#### QUESTION 4

- (a) Sara Ahmad is the production manager at a company that manufactures plastic furniture. Sara needs a demand forecast for the next few years to help decide whether to add new production capacity. The company's sales history (in thousands of units) is shown in the table below. Use exponential smoothing with trend adjustment to forecast demand for period 6. The initial forecast for period 1 was 11 units; the initial estimate of trend was 0. The smoothing constants are  $\alpha = .3$  and  $\beta = .3$  [Hint:  $F_t = \alpha(A_{t-1}) + (1 - \alpha)(F_{t-1} + T_{t-1})$ ;  $T_t = \beta(F_t - F_{t-1}) + (1 - \beta)T_{t-1}$ ]

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Period	Actual
1	12
2	15
3	16
4	16
5	18

[12 Marks]

- (b) Supplier selection considers numerous factors, such as strategic fit, supplier competence, delivery, and quality performance. Because a firm may have some competence in all areas and may have exceptional competence in only a few, selection can be challenging. Discuss the four-stage process for supplier's selection.

[8 Marks]

**QUESTION 5**

- (a) What is ABC inventory analysis? Identify THREE (3) policies that may be based upon the results of an ABC analysis.

[6 Marks]

- (b) Your company has compiled the following data on the small set of products that comprise the specialty repair parts division. Perform ABC analysis on the data. Which products do you suggest the firm keep the tightest control over? Explain.

Item	Annual Demand	Unit Cost
A211	1200	\$9
B390	100	\$90
C003	4500	\$6
D100	400	\$150
E707	35	\$2000
F660	250	\$120

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G473	1000	\$90
H921	100	\$75

[9 Marks]

(c) Differentiate between a push and a pull system.

[5 Marks]

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